



- The union comprises a stamped union nut 1 held captive on a stamped and machined tubular member 2 secured to a further member 3 which is a forging.
- 5 The union nut 1 is internally screw-threaded for engagement with external screw threads on a first member, not shown, and is provided with an internal radial flange 4 for engagement with an external radial flange 5 which is an integral part of one end of the tubular member 2. When the union nut 1 is screwed in use onto the first member the tubular member 2 is drawn towards the first member by the engagement between 15 the flanges 4 and 5.
- The further member 3 is formed with an external tapered screw thread 6 for engagement with an internal co-operating screw thread of a second member, not 20 shown, and is provided with an integral polygonal radial flange 7 for engagement by a spanner during tightening in use of the further member 7 to the second member.
- Initially the other end 8 of the tubular 25 member 3 comprises a plain sleeve. Prior to assembly of the union nut 1 onto the sleeve the exterior of said other end 8 is formed with a plain external screw thread for engagement with a complementary screw 30 thread formed internally of the further member 3. The union nut is then assembled onto the tubular member 2 by passing it over said other end 8 of the tubular member. The tubular member and the further member are 35 then screwed together and a ball plunger or roller burnishing tool is inserted into the joint between the members by passing it through the further member 3, and the joint between the members is expanded radially over the distance A by cold forming to 40 increase the internal diameter D of the joint and to bind the screw threads of the joint together to form a gas-tight seal between the tubular member 2 and the further member 45 3.
- In one example the initial diameter D is 0.875 inches and a plunging tool of 0.925" diameter is used. The diameter D is thus increased by slightly more than 4% of its initial value.
- 50 In order to increase the break-loose torque of the joint between the members 2 and 3 a drop of a screw-thread locking material such as that sold under the Registered Trade Mark 'LOCTITE' STUDLOCK (OR GRADE 75) is applied to the middle part of one of the screw threads before the members 2 and 3 are screwed together.

## WHAT WE CLAIM IS:—

1. A method of manufacturing a pipe union of the kind set forth comprising forming said other end of the tubular member and said further member with complementary screw threads, assembling the union nut onto the tubular member by passing it over said other end of the tubular members, screwing said tubular member to said further member, and then permanently deforming the screw-threaded joint between said tubular member and said further member by expanding the joint radially. 60
2. The method according to claim 1 in which the tubular member is formed with its screw thread prior to assembling the union nut onto the tubular member. 65
3. The method according to claim 1 or claim 2 in which prior to screwing the tubular member to said further member screw-thread locking material is applied to at least one of the co-operating screw threads. 70
4. The method according to any of the preceding claims in which the co-operating screw threads comprise an external screw thread formed on the tubular member and an internal screw thread formed on said further member. 75
5. The method according to any of the preceding claims in which the expansion of the joint is performed by cold forming. 80
6. The method according to claim 5 in which the joint between the tubular member is expanded by insertion of a ball plunger. 85
7. The method according to claim 5 in which the joint between the tubular member is expanded by a roller burnishing tool. 90
8. The method according to any of the preceding claims in which the tubular member and said further member are of brass. 95
9. The method according to any of the preceding claims in which the internal diameter of the joint between the tubular member and said further member is increased by more than four per cent of the initial diameter. 100
10. The method according to claim 1 and substantially as described with reference to the accompanying drawing. 105
11. A pipe union of the kind set forth produced by the method according to any of the preceding claims. 110
12. A pipe union of the kind set forth manufactured according to the method of claim 10 and substantially as described with reference to the accompanying drawing. 115

- The union comprises a stamped union nut 1 held captive on a stamped and machined tubular member 2 secured to a further member 3 which is a forging.
- 5 The union nut 1 is internally screw-threaded for engagement with external screw threads on a first member, not shown, and is provided with an internal radial flange 4 for engagement with an external radial flange 5 which is an integral part of one end of the tubular member 2. When the union nut 1 is screwed in use onto the first member the tubular member 2 is drawn towards the first member by the engagement between the flanges 4 and 5.
- 10 The further member 3 is formed with an external tapered screw thread 6 for engagement with an internal co-operating screw thread of a second member, not shown, and is provided with an integral polygonal radial flange 7 for engagement by a spanner during tightening in use of the further member 7 to the second member.
- 15 Initially the other end 8 of the tubular member 3 comprises a plain sleeve. Prior to assembly of the union nut 1 onto the sleeve the exterior of said other end 8 is formed with a plain external screw thread for engagement with a complementary screw thread formed internally of the further member 3. The union nut is then assembled onto the tubular member 2 by passing it over said other end 8 of the tubular member. The tubular member and the further member are 20 then screwed together and a ball plunger or roller burnishing tool is inserted into the joint between the members by passing it through the further member 3, and the joint between the members is expanded radially over the distance A by cold forming to increase the internal diameter D of the joint and to bind the screw threads of the joint together to form a gas-tight seal between the tubular member 2 and the further member 3.
- 25 In one example the initial diameter D is 0.875 inches and a plunging tool of 0.925 diameter is used. The diameter D is thus increased by slightly more than 4% of its initial value.
- 30 In order to increase the break-loose torque of the joint between the members 2 and 3 a drop of a screw-thread locking material such as that sold under the
- 35 Registered Trade Mark 'LOCTITE' STUDLOCK (OR GRADE 75) is applied to the middle part of one of the screw threads before the members 2 and 3 are screwed together.
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- WHAT WE CLAIM IS:—**
1. A method of manufacturing a pipe union of the kind set forth comprising said other end of the tubular member and said further member with complementary screw threads, assembling the union nut onto the tubular member by passing it over said other end of the tubular members, screwing said tubular member to said further member, and then permanently deforming the screw-threaded joint between said tubular member and said further member by expanding the joint radially.
  2. The method according to claim 1 in which the tubular member is formed with its screw thread prior to assembling the union nut onto the tubular member.
  3. The method according to claim 1 or claim 2 in which prior to screwing the tubular member to said further member screw-thread locking material is applied to at least one of the co-operating screw threads.
  4. The method according to any of the preceding claims in which the co-operating screw threads comprise an external screw thread formed on the tubular member and an internal screw thread formed on said further member.
  5. The method according to any of the preceding claims in which the expansion of the joint is performed by cold forming.
  6. The method according to claim 5 in which the joint between the tubular member is expanded by insertion of a ball plunger.
  7. The method according to claim 5 in which the joint between the tubular member is expanded by a roller burnishing tool.
  8. The method according to any of the preceding claims in which the tubular member and said further member are of brass.
  9. The method according to any of the preceding claims in which the internal diameter of the joint between the tubular member and said further member is increased by more than four per cent of the initial diameter.
  10. The method according to claim 1 and substantially as described with reference to the accompanying drawing.
  11. A pipe union of the kind set forth produced by the method according to any of the preceding claims.
  12. A pipe union of the kind set forth manufactured according to the method of claim 10 and substantially as described with reference to the accompanying drawing.

BARKER, BRETELL & DUNCAN  
Chartered Patent Agents  
Agents for the Applicants  
138 Hagley Road  
Edgbaston  
Birmingham B16 9PW.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1977.  
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from  
which copies may be obtained.

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